

What is claimed is:

- 1 1. A hybrid device comprising:
2 a sensor having a permanent magnet adjacent to a
3 permeable pole piece and a sensor coil coupled
4 to the pole piece providing a sensor output;
5 a target for interacting with the sensor;
6 an excitation means for energizing the sensor coil;
7 and
8 an output signal detector connected to the
9 excitation means.
- 1 2. The hybrid device according to claim 1 wherein the
2 permeable pole piece is fabricated as a cylinder,
3 the permeable pole piece having a concentric axis.
- 1 3. The hybrid device according to claim 2 wherein the sensor
2 coil is a spiral coil surrounding the permeable pole
3 piece along the concentric axis of the permeable
4 pole piece.
- 1 4. The hybrid device according to claim 1 wherein the
2 excitation means is an inductive bridge.
- 1 5. The hybrid device according to claim 4 further
2 comprising: a temperature compensation coil coupled
3 across the inductive bridge.
- 1 6. The hybrid device according to claim 1 wherein the
2 excitation apparatus is a Colpitts Oscillator.
- 1 7. The hybrid device according to claim 1 wherein the output
2 signal detector correlates the sensor output to a
3 target surface velocity.

1 8. The hybrid device according to claim 1 wherein the output
2 signal detector correlates a sensor output to
3 proximity between the target and the sensor.

1 9. The hybrid device according to claim 1 wherein the
2 permeable pole piece is fabricated as a hollow
3 cylinder having a concentric axis.

1 10. The hybrid device according to claim 9 wherein the
2 sensor coil is a spiral coil within the permeable
3 pole piece, the spiral coil is wound along the
4 concentric axis of the permeable pole piece.

1 11. The hybrid device according to claim 9 wherein the
2 permeable pole piece is fabricated as a caliper, the
3 permeable pole piece having a concentric axis.

1 12. A hybrid device comprising:
2 a sensor having a permeable pole piece with a sensor
3 coil coupled to the permeable pole piece;
4 a target having at least one permanent magnet for
5 interacting with the sensor;
6 an excitation apparatus connected to the sensor
7 coil; and
8 an output signal detector connected to the
9 excitation apparatus for determining sensor
10 output.

1 13. The hybrid device according to claim 12 wherein the
2 permeable pole piece is fabricated as a cylinder,
3 the permeable pole piece having a concentric axis.

- 1 14. The hybrid device according to claim 12 wherein the
2 sensor coil is a spiral coil surrounding the
3 permeable pole piece along the concentric axis of
4 the permeable pole piece.
- 1 15. The hybrid device according to claim 12 wherein the
2 excitation means is an inductive bridge.
- 1 16. The hybrid device according to claim 14 further
2 comprising:
3 a temperature compensation coil coupled across the
4 inductive bridge.
- 1 17. The hybrid device according to claim 12 wherein the
2 excitation apparatus is a Colpitts Oscillator.
- 1 18. The hybrid device according to claim 12 wherein the
2 output signal detector correlates the sensor output
3 to the velocity of the at least one permanent
4 magnet.
- 1 19. The hybrid device according to claim 12 wherein the
2 output signal detector correlates a sensor output to
3 proximity between the at least one permanent magnet
4 and the sensor.
- 1 20. The hybrid device according to claim 12 wherein the
2 permeable pole piece is fabricated as a hollow
3 cylinder having a concentric axis.
- 1 21. The hybrid device according to claim 20 wherein the
2 sensor coil is a spiral coil within the permeable

3 pole piece, the spiral coil is wound along the
4 concentric axis of the permeable pole piece.

1 22. The hybrid device according to claim 12 wherein the
2 permeable pole piece is fabricated as a caliper, the
3 permeable pole piece having a concentric axis.

1 23. The hybrid device comprising:
2 a sensor having a permanent magnet adjacent to a
3 permeable pole piece and a sensor coil coupled
4 to the pole piece, the permeable pole piece is
5 fabricated as a cylinder, the permeable pole
6 piece having a concentric axis, the sensor coil
7 is a spiral coil surrounding the permeable pole
8 piece along the concentric axis of the
9 permeable pole piece;
10 a target for interacting with the sensor;
11 an excitation apparatus connected to the sensor
12 coil, the excitation apparatus is an inductive
13 bridge;
14 a temperature compensation coil is coupled across
15 the inductive bridge; and
16 an output signal detector connected to the
17 excitation apparatus for determining sensor
18 output, the output signal detector correlates
19 the sensor output to a target surface velocity
20 measurement.